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VORTEX HYDRAULIC HEAT GENERATOR – ALTERNATIVE POWER SOURCE

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One alternative types of renewable energy vortex is energy, which is a technology of using swirling flows of continuous media (e.g., liquid and gas) to convert them into heat, work, temperature and pressure gradient.

One of the promising directions in solving this problem is to use a hydraulic vortex heat generators (VGT) - devices that produce heat by altering the physical and mechanical properties of the liquid medium at her during a complex-Stimulation accelerated and braked movement.

The purpose of research - analysis of the use of eddy teplogenerato-ing as an alternative source of energy.

Materials and methods of research. Acceleration of the flow is achieved by creating a vortex in the systems of flow swirling vortex-compensated-operator with a simultaneous flow constriction in confusor and braking - is following its expansion in the heat source and the cavitation tunnel razvihreniem flow at the outlet of its cavitation tunnel. Due to the friction surface of the body fluid velocity decreases, the temperature rises. Additional heating liquid is also due to the internal friction of layers of liquid at different radii from the axis of the housing and having different circumferential speeds. But the main role in heating plays cavitation. Due to cavitation of the water goes into the orderly, kolloidopodobnoe close to the liquid-crystalline state, and the transition is accompanied by the intense heat. The transition of this type can be defined as the phase transition in a broad sense to suggest that the process of cavitation in the water undergoes a phase transition with the exothermic generating excessive heat. Experimentally, it is shown that phase transition (hydrodynamic rupture) occurs when the flow rate reaches a value at which the static pressure of the liquid reaches its saturation vapor pressure.

Heating system based on the heat source consists of a vortex of the vortex cavitation pipe heat transfer device (heat-nick battery, heaters, etc.), a hydraulic pump with an electric motor and remote control operation vortex heat.

Features hydraulic vortex heat generators (VGT):

- The device clean, there is no need for combustion of hydrocarbon fuels (coal, oil, gas);
- No electric heating elements;
- Electricity is only used to supply the drive hydraulic pump;
- There is no need for water treatment;
- May be heated liquid from any source (water, oil, gas condensate, ...);
- Possible appearance of deposits on the inner surfaces of the heat source;
- Can be connected to any heating system;
- Combine in one device the functions of heating and pumping;
- It provides automatic control of the flow temperature in a predetermined temperature range;
- There are no moving parts;
- Economical to operate and maintain.

The results of research. Laws of flow swirling flow are substantially different from the well studied axial flow. It is these differences cause wide application prospects swirling flows to solve engineering problems, in particular for heating systems.

The proposed version of the hydraulic calculation of eddy heat source is the differential equation of motion and continuity.

It is found that for an annular viscous turbulent swirling flow of an incompressible fluid in a horizontal cylindrical conduit with given boundary (slip condition of the liquid on the wall) and the initial conditions at the input end z = 0, defined by the function Gn (r) bHn (r), in each case, It can be obtained the distribution of all the components of velocity, pressure and vortex rope radius as a function of the distance from the initial alignment and the current radius.

A feature of the vortex motion is the rotation of the elementary particles of the fluid around their instantaneous axes. In circular motion is no rotation, and therefore it is a potential. In fact, the flow of a real fluid swirl everywhere.

Of engineering methods for determining the effectiveness of VGT is-is exergy method of thermodynamic analysis of the technical B tems transformation of energy and matter, according to which the effectiveness of the system in teplopreobrazovaniya VGT estimated coefficient of energy conversion and efficiency.

Under the working capacity or exergy heat understand the possible amount of the technical work that is able to do this thermodynamic system in a given initial state, provided that all make the system process status changes are reversible and are carried out to the end of the thermodynamic state of equilibrium with the environment , those. - The quantity of operation can be obtained in an ideal (reversible) process by any amount of heat.

When different modes of operation of the system, the conversion factor heat varied between 1.77 - 2.41, and the efficiency is 28%.

Conclusions

In Russia, it is now actively expanding production and exploitation is vortex heat and most active in places where there is no central heating system. As the cost of thermal energy the best modification VGT approaching gas boiler, which currently are the cheapest producers of hot water. This and other advantages of BHT (as compared with conventional) are of great interest to consumers, because they have an opportunity to significantly improve environmental and economic performance of both industrial and municipal sectors.

The proposed version of the theoretical foundations of the work VGT and method for evaluating the effectiveness of the VGT is based on the use of exergy method of thermodynamic analysis of thermal systems, is based on the creation of a meaningful number of VGT.

Vortex heat generator hydraulic promising use as an autonomous heating system and heating in various areas of life:

- Objects of agriculture,
- Cottage arrays
- Warehouses, etc.

VGT provides ecological cleanliness of process heat generation, minimal heat loss during transmission to the consumer and high-eco- nomic efficiency.